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OFFICER PERSONNEL RESEARCH PROGRAM

**Final Status Report
Contract Nonr 890(01)**



AMERICAN INSTITUTE for RESEARCH
PITTSBURGH, PENNSYLVANIA

OFFICER PERSONNEL RESEARCH PROGRAM

Final Status Report

Contract Nonr 890(01)

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Final Status Report, Officer Personnel Research Program,
American Institute for Research, under Contract Nonr 890(01)

I. Introduction

The work under this contract, which terminates on 31 March 1955, began 1 June 1952. During most of the life of the Officer Personnel Research Program (OPRP) its activities were centered in Newport, Rhode Island, at the U. S. Naval School, Officer Candidate (OCS). At the end of August 1954 the loci of activity shifted to the American Institute for Research (AIR) offices in Pittsburgh and Washington, where the final phases of the work were conducted.

II. Early Explorations

The first phase of activities, of approximately three months duration, consisted primarily of a survey of officer training facilities and associated problems, and the development of a rationale and plan for an integrated program of officer personnel research.

A. Completed in the last week of August 1952 was an interview survey of research needs of the officer candidate program at the OCS and at other locations in the Navy. The interviews were semi-structured to develop the following information: (1) the best features of OCS training, (2) ways in which OCS training might be improved, (3) comparison of OCS training with officer training at other sources, (4) possible avenues for research, (5) the need for developing general and specific skills and knowledges.

The results of the interviews were organized to permit discussion under several headings. The resulting report, an informal intra-office memorandum was non-evaluative of current practices and conditions, but was intended to reflect questions which arose relevant to officer training needs. The report dealt with problems in the following areas: (1) selection and classification, (2) training problems, (3) evaluation, (4) personnel management.

This report, in rough draft form, was transmitted to the Personnel Analysis Division, Bureau of Naval Personnel, with the title "Interim Progress Report of Phase I Activities, Officer Personnel Research Project," by T. R. Vallance and A. S. Glickman, dated 2 September 1952.

B. On 15 October 1952 a second intra-organizational report was completed, summarizing the activities prior to that time, setting

forth a fundamental rationale for a continuing research program in officer personnel, and presenting a set of recommendations for specific research undertakings to be implemented within the remainder of the first year contract period.

The rationale for the continuing research program dealt with the problem areas: (1) defining criteria, (2) selection, classification, and prediction, (3) training.

The rationale together with consideration of local interests and practical expediency gave rise to several recommendations for research.

This report was passed on to the Personnel Analysis Division as: "Phase I Report - A plan for research." The part dealing with rationale served as the basis of a professional article: Vallance, T. R., Glickman, A. S., and Suci, G. J. Criterion Rationale for a Personnel Research Program. Journal of Applied Psychology, 1953, 37, 429-431.

C. On 3 December 1952, the scope of the original contract was expanded to authorize about one year of work embracing related research in the WAVE officer program. This work also got under way with a survey of research needs, made during January and February of 1953, and culminated in an informal report and set of recommendations, which was transmitted to interested personnel at the Bureau of Naval Personnel and the U. S. Naval Schools Command, Newport: Nunnally, J. C., Jr. "The WAVE Project: A Survey of Needs for a General Plan of Research," 6 March 1953.

D. "Program Recommendations for Officer Personnel Research Project, Fiscal Year 1954," dated 24 April 1954, was an informal report prepared by T. R. Vallance, A. S. Glickman, and G. J. Suci, which served as a basis for discussion of extension of the contract for a second year, setting forth proposed research tasks. This extension was granted. A subsequent extension granted during the summer of 1954 authorized continuance of activities through the end of December, 1954, at which time a further extension was granted through the end of March, 1955.

III. Research Tasks Involving Mal. Officers

For purposes of discussion we will group the research tasks involving male officers under the headings of the three problem areas developed in our rationale, as indicated above. (The work with WAVES will be considered separately.) Research reports

covering these tasks were for the most part prepared in two forms: (1) as Technical Bulletins, published by the Personnel Analysis Division, Bureau of Naval Personnel, and (2) informal "Officer Personnel Research Program Research Memoranda," which were circulated intra-organizationally at AIR and the Personnel Analysis Division. Many of the "Research Memoranda" subsequently evolved as Technical Bulletins. Where the contents of a "Research Memorandum" are substantially contained within a Technical Bulletin no separate citation of the former will be made here.

A. Defining criteria

In the criterion rationale developed for the program it was pointed out that three levels of performance evaluation might be employed as criteria. Ranging from the most immediate to the most ultimate they were: individual performance evaluation at school, individual performance evaluation on duty after graduation, and performance evaluation of the ship as a whole. Levels of performance evaluation still closer to the theoretically ultimate criterion may be considered abstractly, but the overall performance of the ship as a unit represents the highest level at which reasonably objective measurement seemed obtainable.

1. Factor analysis of ship performance

This project used scores from the Damage Control section of the Operational Readiness Inspection (ORI), together with certain other ORI scores, in an exploratory study of factor analysis as a procedure for refining measures of overall ship performance so as to provide higher order criteria against which personnel evaluation, training, classification, and screening procedures might be validated. Six oblique factors were derived utilizing the Wherry-Gaylord iterative technique. The three major factors were:

- a. General damage control exercise evaluation factor
- b. Conning of the ship factor
- c. First aid factor

A report by A. S. Glickman entitled: Factors in Ship Performance was transmitted to PAD. A paper, derived from this report, was presented at the American Psychological Association Convention on 9 September 1953: Glickman, A. S. An Analysis of Some Ship Performance Measures by the Wherry-Gaylord Iterative Factor Analysis (abstract). American Psychologist, 1953, 8, 355. As a corollary study, an inverse factor analysis was made of the same data in order to check the feasibility of determining whether groups of

ships could be distinguished from other ships on the six factors previously derived. Indications were shown that positive results are obtainable. This work was described in: Research Memorandum #3, "An Inverse Factor Analysis of Ship Performance, by A. S. Glickman.

2. The development of critical requirements in the development of junior officers aboard destroyer-type vessels.

The two major projects in this area sought to develop a better understanding of the critical performance requirements for junior officers aboard ship, to serve as the basis and point of departure for further efforts in the Navy's program of officer research.

a. The first of these studies made use of the critical incident technique. Over 3700 critical incidents were obtained. Seventeen hundred of these, describing the performance of ensigns and lieutenants junior grade who were below the administrative level of department head on destroyer-type vessels, were organized into 102 categories which subsumed most of the duty performance activities of junior officers on destroyers. The research is reported in: Vallance, T. R., Glickman, A. S., and Vasilas, J. N. Critical Incidents in Junior Officer Duties Aboard Destroyer-Type Vessels. Technical Bulletin 54-4. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

b. The aim of the second investigation was to discover some of the larger units, or factors, which underlie the detailed description of junior officer performance requirements reported by commanding officers and department heads aboard destroyer-type vessels. Using a Junior Officer Activity Checklist made up of a 25-item sample drawn from the original 102 categories, factor analyses were made of 204 reports submitted by Commanding Officers and of 178 submitted by Department Heads, from an aggregate of 42 destroyers and destroyer escorts. A smaller scale follow-up study employed a 12-item form submitted by Commanding Officers and Department Heads of 17 ships on 99 and 104 officers respectively. Several other minor investigations were carried out in order to provide information which supplemented the data obtained from the first two parts. These results may be found in: Glickman, A. S. A Factor Analysis of Junior Officers' Shipboard Activities. Technical Bulletin 54-17. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954. Another publication stimulated by investigation in this area although not directly a product thereof, was Glickman, A. S.

The Effects of Negatively Skewed Distributions of Ratings Upon Motivation of the Rated. Personnel Psychology, 1955, 8, (to be published).

3. Analysis of peer ratings.

At the school level, much attention was given to non-cognitive criterion performance. It was felt that the nature of the academic achievement criteria had been rather thoroughly explored, having been the subject of a great deal of research in and out of the military service over a long span of years. Peer ratings were considered, on the basis of research evidence found in other military locations, to merit close study as criteria of leadership and "military aptitude," and also as predictors of higher level on-the-job performance.

a. A first study considered the effects upon reliability of two variables believed to influence peer ratings: (1) the extent to which the rater likes or dislikes the ratee, and (2) level of objectivity demanded by the questionnaire (ratings on current OCS behavior being assumed to be more objective than estimates of future behavior). In addition, the reliability of several methods of obtaining peer ratings were compared, including paired comparison, ranking, nomination of "top" and "bottom" five, comparison of each person with a group member who serves as standard. The report of this work is: Suci, G. J., Vallance, T. R., and Glickman, A. S. An Analysis of Peer Ratings: I. The Assessment of Reliability of Several Question Forms and Techniques used at the Naval Officer Candidate School. Technical Bulletin 54-9. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

b. This was followed by a report dealing with the findings regarding the validity of three different peer rating questionnaires as predictors of military aptitude grades given by OCS staff and of measures of academic success; it being desired to gain insight into the make-up of peer ratings from a study of these relationships and their potentiality as intermediate criteria of success during training. This was published as: Suci, G. J. and Vallance, T. R. An Analysis of Peer Ratings: II. Their Validity as Predictors of Military Aptitude and other Measures in the Naval Officer Candidate School. Technical Bulletin 54-10. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

c. An attempt was also made to study re-rater reliability of peer ratings, by comparing ratings received by students who received a peer rating in one class, and then were "rolled back" to a succeeding class to repeat or complete work. The study is reported in Vallance, T. R. "Some Observations on the Stability of Peer Ratings," Research Memorandum #15, dated 27 October 1953.

4. Situational Performance Tests

In Suci, G. J. "Situational Observation of Small Numbers of Subjects as a Means of Testing the Significance of Variables," Research Memorandum #8, dated 9 September 1953, were presented some ideas regarding measurement of non-cognitive performance under "live" conditions. It was not until about one year later that a definite research task dealing with situational performance test development was undertaken in an effort to develop criteria of non-cognitive performance at the school level which might also serve as predictors of on-the-job performance.

Preliminary work on the development of situational performance problems designed to evaluate specific leadership behaviors was conducted at the Officer Candidate School, Newport, during May and August 1954. A set of 16 situational performance problems was then developed. These problems were designed to simulate in essential aspects the duty assignments with which the junior Navy officer might be faced. Individuals were evaluated in groups of four. A total of six hours was required for the administration of the 16 problems. Performance on the problems was evaluated by means of a behavior check-list specific to the problem. The specific behaviors which are evaluated in the set of 16 problems include approximately 40 effective behaviors, and the corresponding 40 ineffective behaviors, selected from the list of 102 critical behaviors reported in Technical Bulletin 54-4.

The following criteria were used in selecting the behaviors to be included in the design of these problems: (1) The behavior is not one involving intellectual ability such as is better measured by a pencil and paper test; (2) The behavior is not one involving technical skills and knowledges such as are better measured by pencil and paper tests and/or by apparatus tests; (3) The behavior is one which can feasibly be measured in a situational problem of short duration, i.e., does not require actual emergency or danger, and does not require continuous lengthy observation. The behaviors evaluated by these problems were the non-cognitive and non-technical leadership skills essential in dealing with personnel and in accepting and carrying out organizational responsibilities.

Preliminary tryout of these materials was conducted at the Naval Academy. Analysis of the data indicated substantial scoring agreement between examiner-pairs assigned to each of the 16 problems, and good distribution of scores. There were, insufficient data to draw any conclusions.

Revisions were made in the problem materials on the basis of Navy officer reviews and preliminary tryout. A more extensive tryout of the problem materials was conducted at the Officer Candidate School at Newport. In this tryout significant differences were obtained on the situational problems between OC's having high and low peer ratings. The results are contained in: Suttell, Barbara J. and Richlin M. "Development of Situational Performance Problems for Evaluating and Training Potential Naval Officers." Research Memorandum #29, dated 30 December 1954.

B. Selection, classification, and prediction

1. Development of individual predictors of OCS criteria

This project initially was closely related to the peer rating studies, both conceptually and in its operations, partly because the military marks at OCS appeared to be strongly influenced by the peer ratings (a pilot study showed correlations as high as .85 between midterm grades and military marks). Therefore, it appeared worthwhile to attempt prediction of the peer ratings by non-cognitive measures as well as to assess the utility of measures highly weighted in non-cognitive aspects, in accounting for academic and military grade variance not yet measured by selection tests already in use.

a. The first research effort in this area started with an exploratory study which used anonymous questionnaires administered to OC's, requesting them to describe the persons considered to be the "best" and the "worst" future officers, and those best liked and least liked, among section mates. An analysis of these questionnaires suggested three general factors: (1) Having general ability and being aware of it, (2) The "All-American boy," and (3) "Ego-Flexibility." The factors just named were considered as sources of suggestions for predictor variables. Several already available measures were selected for tryout: (1) the California Authoritarianism (F) scale, (2) a numerical Rigidity Test (adaptation of Luchins' water bottle problems), (3) the Allport-Vernon Study of Values, and (4) the Allport Ascendance-Submission Test. A trial form of a "Social Situations Test" was developed to assess

ability to deal with others in problem situations utilizing the factors suggested within "ego-flexibility." The experimental tests were administered to one sample of incoming OC's under instructions designed to induce stress, and to another group with instructions designed to alleviate stress. Correlational analysis indicated that the predictor tests did not show close enough relationship with OCS performance measures to justify recommendations for adoption as predictor instruments. The Rigidity Test and certain aspects of the F-scale showed sufficient promise to justify further investigation. A fuller description of this work is given in: Suci, G. J. and Vallance, T. R. The Validity of Several Non-Cognitive Tests as Predictors of Certain Naval Officer Candidate School Criteria. Technical Bulletin 54-5. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

b. Continuing along the lines suggested in the preceding paragraph, another battery of nine experimental variables was investigated with a subsequent sample of entering OC's.

1) F-scale. Items were factor analyzed, including peer ratings as a reference variable in the intercorrelation matrix. Items positively loaded on the peer rating factor were used to form a key for scoring the scale. Cross-validation on a later sample showed zero-order correlations with peer ratings and provided no better prediction of academic grades (i.e. significantly negative) than the simple sum of F-scale items.

2) Stereotype test. It was suspected that, on the F-scale, responses were in some degree determined by an attempt to stereotype, i.e. to answer in the manner of the "successful officer candidate." It was hypothesized that ability to estimate how a successful OC would answer a series of items is related to success itself, as measured by military aptitude criteria. OC's were asked to respond to the F-scale as they believed the best OC would do. A key based on analysis of these responses was developed for scoring scales administered under the "biased" condition. It was also used to score "true" responses (obtained under usual instructions). No significant correlations were shown with any of the criteria.

3) Rigidity Tests. Since the Luchins type numerical Rigidity Test had shown promise, it was administered again, along with a verbal rigidity test developed by Dr. Emory Cowan, and adapted for group administration. Cowan's test consists of alphabetical mazes. The subject spells out a simple phrase by

moving from upper right to lower left. The "Einstellung" is prepared by three items. Its maintenance or rejection is indicated by "long" or "short" solutions to subsequent mazes. Validation attempts gave negative results.

4) Career Intensity Profile (CIP). This is a biographical information blank which the Bureau of Naval Personnel developed. It had shown substantial validity in the Naval Academy, where subjects had been told that the results would be used for research purposes only. At OCS the test was administered to one company with similar instructions, and was presented to another company as one of the "regular" battery of tests. Generally negative results were found.

5) Leadership Opinion Questionnaire (LOQ). This was a test developed by E. A. Fleishman at the Ohio State University, containing two 20-item scales measuring factors of "Initiating Structure" and "Consideration." Relative independence of the scales was corroborated in the OCS setting. Administration of the LOQ to two companies produced inconsistent results.

6) Naval Knowledge Test (NKT). The basic rationale for this test was that other things equal, those men who prior to entering the Navy had acquired more knowledge about naval matters would manifest greater interest and motivation both in training and on the job, and thus perform at a higher level. It originally consisted of 136 multiple-choice items of five kinds: identification or definition of naval terms and symbols; prominent ships in naval history; prominent naval personalities; prominent events and locations in naval history; and naval organization and practices. Validity of this test for prediction of academic success was consistently demonstrated. It also improved prediction when used in combination with the Officer Qualification Test (OQT), the main selection test then in use for screening applicants from civilian sources. Subsequent item analyses led to the recommendations for use of a 76-item form for predicting OCS academic success. The developmental work is reported in: Glickman, A. S. The Naval Knowledge Test: Construction and Validation. Technical Bulletin 54-7. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954. Later item analyses were reported in: Glickman, A. S. "Further Item Analyses of the Naval Knowledge Test." Research Memorandum #24, dated 30 March 1954. To predict OCS peer ratings another 15 item key was constructed, as reported in: Glickman, A. S. "A Naval Knowledge Test Key to Predict OCS Peer Ratings." Research

Memorandum #25, dated 22 April 1954. It did not survive cross-validation.

The Naval Knowledge Test is now being given a tryout by the Office of Naval Officer Procurement (ONOP).

7) Verbal-Numerical Test (VNT). Originally called a "Stress-Decrement Test," the original items and form of this test were developed by Dr. J. C. Munnally, Jr. of the OPRP staff. The original form involved five subtests of 20 items each. The time limits for subtests were successively 14, 12, 10, 8, and 6 minutes. The items required simple numerical operations, but were presented in fairly complex verbal context. The test was conceived as a measure of "intellectual staying power," or the ability to maintain the use of the skills measured under increasing pressure. One method of scoring reflects the rate at which the person's performance falls off from the initial level (decrement). Several other organizations of items and instructions were experimented with on different groups, but a form which gave the 100 items in a single 40-minute period (maximum number of items attempted, about 90) and used as a score the simple sum of items correct, proved as good as any. This test showed consistent evidence of validity for predicting academic grades, both alone and in combination with the OQT. It is described in: Vallance, T. R. and Glickman, A. S. The Verbal-Numerical Test: Development and Validation. Technical Bulletin 54-15. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

The Verbal-Numerical Test is being used on a trial basis by the Office of Naval Officer Procurement.

Other informal reports that grew out of the tasks just cited were: Glickman, A. S. "OCS Peer Rating, Pilot Study," dated 6 November 1952; and Suci, G. J. "Survey of the Literature Regarding Promising Non-cognitive Test and Variables," Research Memorandum #7. Vallance, T. R. "Rationale for the Development of a Test of Empathy," Research Memorandum #9, dated 14 September 1953, was written as a proposal for research, but the opportunity to proceed further with development of such a test did not develop.

c. In addition to the test variables already described, work was pursued in the evaluation of background variables for predicting disenrollment from OCS. These were: Age, University or College Attended, Major Subject, and Dependency Status. Using data from four OCS classes, weights were found for each variable category based upon the proportion, in each category,

of the number of students graduating to the number of students entering OCS. These weights were used to assign scores to members of the next three entering classes. Correlations were obtained between these scores and a pass-fail criterion. It was found that a single score (labelled "U") representing the summed weights for University or College Attended and Major Subject had point-biserial validity significant beyond the 1% confidence level. The partial correlation, holding OQT score constant, was also significant. The outcomes of this work may be found in: Glickman, A. S. Prediction of Disenrollment from Officer Candidate School from Background Variables. Technical Bulletin 54-8. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

2. Development of predictor batteries.

As evidenced above, a good part of the first year of the Officer Personnel Research Program was dedicated to test development, aimed mainly at the measurement of characteristics related to OCS success which were not already measured by the OQT used by the Office of Naval Officer Procurement.

a. In November of 1953, five tests, providing eight measures, were administered to incoming OC's. The tests were the VNT, F-scale, NKT, LOQ, and a Level of Aspiration (LA) form, which had shown promising results in work with WAVE officers. Essentially it asked the OC's to predict how they would stack up against their associates in OCS in academic grades, military grades, and peer ratings. OQT scores were available from tests previously administered by ONOP, and U-scores were also derived from student records. In all, ten of the variables, which previous experience had shown to hold most promise, were included in a battery to predict the sum of academic grades at the end of four weeks of OCS classes. Two companies (N = 274) were used in validation; one company (N = 134) in cross-validation. The Wherry-Doolittle test selection procedure picked as most predictive of the criterion the OQT, VNT, NKT, and U-score. The OQT alone correlated with the criterion .557. The multiple correlation of four variables correlated .675. Appropriate regression weights were applied to the scores made by the hold-out company to obtain a "battery score." The battery score produced a coefficient of cross-validity of .685. More details are available in: Glickman, A. S. and Vallance, T. R. Development and Validation of an Experimental Battery to Select Officer Candidates for the Navy. Technical Bulletin 54-12. Washington: Personnel

Analysis Division, Bureau of Naval Personnel, 1954. Employment of this four-variable battery in subsequent samples continued to give demonstrations of validity, as reported in Technical Bulletin 54-15, previously cited, and in: Glickman, A. S. "Prediction of Academic Success of ROCTWO Students," Research Memorandum #28, dated 5 October 1954.

b. The ten-variable battery was also evaluated against a peer rating criterion, using the same population as in ~~a~~ above. A multiple correlation of .35 was found with four variables. When a correction was introduced to remove the variance of the criterion associated with academic achievement the estimated correlation dropped to .27. The coefficient of cross-validity for the four variables was .18 for both the corrected and uncorrected criterion. The highest coefficient of cross-validity for a combination of variables was .19, using LA-Academic and LA-Military, weighted in a composite to predict the corrected criterion. In cross-validation, the highest correlation with Peer Ratings obtained with a single variable was .22 for LA-Academic. However, this reduced to -.01 when correction was introduced to remove the variance of academic achievement. These unsanguine results are found in Glickman, A. S. Development and Validation of a Battery to Predict Peer Ratings of Navy Officer Candidates. Technical Bulletin 54-13. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

3. Preliminary study of OCS performance in the "enlisted-to-officer" program.

This was a minor study made of age, length of service, number of service schools attended, several test scores, and OCS final grades made by the 48 members of the first group of non-college OC's drawn from the Fleet for the Integration Program in an effort to look into such questions as: (1) How do tests compare with naval experience as indicators of likely success in training? (2) Can tests do an adequate job of selecting enlisted-to-officer trainees? (3) How do the enlisted-to-officer selectees thus far trained differ in OCS performance from regular OC's of equal test abilities. If differences exist, can they be accounted for by differences in experience?

The "enlisted-to-officer" trainees far exceeded in final grades a group of regular OC's matched on Officer Classification Battery (OCB) average, indicating that as yet unmeasured factors contributed to the high level of their performance.

An informal report was prepared: Vallance, T. R. "Preliminary Study of Performance in Enlisted-to-Officer Program," Research Memorandum #12, dated 27 October 1953.

C. Training

1. Development of achievement examinations for NROTC and OCS.

In the area of training of male officers, the first major program got underway in the fall of 1953.

The purpose of this project was to revise the examinations employed in assessing achievement in the Naval Officer Candidate School and the Naval Reserve Officer Training Corps so as to more effectively test "integrated knowledge," and to conduct research designed to define and evaluate integrative test items. Some previous work of this kind had been directed by Dr. J. B. Carroll of Harvard University under a separate AIR contract, Nonr 890(02), during the preceding year.

A definition of integrative items, which was developed in previous work, was revised to read: "Integrative items are those which require the bringing together of several knowledges and/or skills, from one or several subjects, to answer a single question of fact, solve a problem, or make a decision in a situation relevant to the job of a line ensign."

A pool of about 2500 items for both training programs was developed, and the tests were revised from these. Of the six OCS tests, three were completely revised and the other three underwent partial revision. The four NROTC exams were partially revised. Evaluation of the revised NROTC tests was not possible at the time of completion of this project, but an evaluation of the new OCS tests showed them to be slightly more reliable and valid than their predecessors. All of the tests appear to have greater face validity than those which they replaced.

In planning the research, it was desired to find if integrative items can be separated from non-integrative items on the basis of a priori criteria, if integrative items are more reliable and valid than non-integrative items, and if integrative items can be distinguished from non-integrative items on the basis of the knowledges or skills involved in each. The findings of the research were that: (1) Items can be reliably

classified as integrative or non-integrative. (2) Integrative items are more reliable and valid than non-integrative items. (3) Integrative items relevant to the OCS curriculum have more mathematical and mechanical content than do non-integrative items relevant to this curriculum.

For the description of this work see: Bernstein, A. J. Achievement Test Research and Development for the Naval Officer Candidate School and the Naval Reserve Officer Training Corps. Technical Bulletin 54-21. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

2. Relevance of officer training program content to duties of junior officers on destroyer-type vessels.

The objective of this research was to identify those aspects of the OCS curriculum which are most and least relevant to duties of newly commissioned ensigns aboard destroyers; thus to provide responsible authorities with information useful in preparing recommendations aimed toward the improvement of training.

More than one thousand critical incidents of effective and ineffective performance by destroyer ensigns were available from earlier research. These were typed on cards and sorted successively by project and OCS staff personnel according to the OCS curriculum area to which each was most relevant. A small percentage was classified as not related to the curriculum. The "relevant" incidents assigned to each area, were then classified as: (1) "Taught"--currently the subject of specific lessons of OCS instruction, and (2) "Not Taught"--pertain to a subject matter area in the curriculum, but not covered due to time and/or facility limitations.

A Junior Officer Training Requirements Checklist was sent to 340 commanding and executive officers of destroyer-type vessels, and was completed by more than 300 of them. The checklist was prepared in ten forms, each containing approximately 100 incidents. Each form was sent to 30 to 50 officers, with instructions to make a judgment for each incident as to: "How soon in number of months after his reporting aboard directly after being commissioned, under normal conditions, would you expect the new reserve officer to be able to handle the situation to your satisfaction?" From their answers "time expectancy for satisfactory performance (TESP)" values were determined for each incident with high reliability. It was assumed that the sooner the ensign is expected to handle a situation satisfactorily, the more "important" it is that the relevant material be learned at OCS.

The findings indicate that the new ensign most frequently and most immediately will be called upon to draw on background relevant to courses in: (1) Orientation and Military Justice, (2) Seamanship, and (3) Operations. More specifically, within each of these areas, major requirements involve: (1) human relations, leadership, and personnel administration skills; (2) officer-of-the-deck duties (especially in-port), and boat handling; and (3) maneuvering board, registered publications, and cryptosystems.

The report of this research is found in: Glickman, A. S. and Vallance, T. R. An Exploratory Study of the Applicability of Critical Incident Techniques to the Assessment of Curricula for Officer Candidate Training. Technical Bulletin 54-23. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

D. Other

1. An exploratory series of interviews was conducted with fourteen former OC's within a week after they had been disenrolled from the school at their request, seeking to gain insight into motivations affecting a decision to seek a commission and motivations that might affect a decision to seek retention as an officer in the Regular Navy, as a source of ideas for possible research tasks involving motivation for a naval career. This was written up in: Glickman, A. S. "Commentary Deriving from Interviews with Some Voluntary Disenrollees from OCS," Research Memorandum #2, dated 5 June 1953.

IV. Research Tasks Involving Female Officers

The research dealing with WAVE officers covered many of the same problems as have already been discussed concerning male officers. Consistent difficulty in this research was occasioned by the small number of student officers enrolled at the Indoc-trination Unit (W) at any one time. The major part of this work is summarized in: Nunnally, J. C., Jr. Research in Selection Instruments for Women Naval Officers, Technical Bulletin 54-14. Washington: Personnel Analysis Division, Bureau of Naval Personnel, 1954.

A. A study of interests, backgrounds, and motives susceptible to recruitment.

To determine characteristics of successful and unsuccessful indoctrinees and thus be able to provide procurement agencies

with useful information for recruiting larger numbers of desirable applicants a biographical information form was given to a group of indoctrinees. Results were also compared with those obtained from a group of college women administered the same form. A strong tendency toward generality of interests and motives was found, together with an indication that current recruitment procedures might be exploiting some of the less potent motives for joining the WAVES, as reported in: Nunnally, J. C., Jr. "A Report on the Interests, Motives and Backgrounds Susceptible to Recruitment for the Women Officer Program for the Navy," Research Memorandum #11, dated 8 October 1953.

B. Critical requirements of successful officer indoctrinees.

To determine characteristics distinguishing successful and unsuccessful officer indoctrinees the top and bottom four members of a class of WAVE officers were studied intensely in a series of eight meetings using a variety of self-ratings, autobiographical materials, behavioral descriptions, ratings by others, and comments and "Q-sort" descriptions by instructors. The pattern differences between successful and unsuccessful indoctrinees were made the basis of a checklist suggested for use at the procurement level, and were used to provide rationale for further development of selection devices. In addition to Technical Bulletin 54-14, further information was given in: Nunnally, J. C., Jr. "A Report on the Non-Cognitive Traits which Differentiate More Successful from Less Successful Women Officer Indoctrinees," Research Memorandum #5, dated 8 July 1953.

C. Development of selection tests.

To develop and evaluate non-cognitive tests in order to improve selection of WAVE officer indoctrinees, differentiating traits revealed in B, were made the basis of a questionnaire, "Personality Schedule #1" (P.S.-1), with particular emphasis placed upon developing forms evading testees' efforts to "look good." Also tried out were the F-scale, a geometrical designs test (requiring indication of preference for different forms), and the CIP. A form of the OQT developed by BuPers for use with women, the WOQT, was used as a cognitive test. The VNT and NKT, which embody both cognitive and non-cognitive elements were also used. Military aptitude and academic grade criteria were employed.

For prediction of academic grades the WOQT, VNT, and NKT showed greatest promise. For prediction of military aptitude the NKT and LA form were the most promising predictors.

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In addition to Technical Bulletin 54-14, which reports the work in this area for the 1953 calendar year, subsequent test research was summarized in: Vallance, T. R. "Selection Test Research on Women Officer Trainees, since 1 January 1954," Research Memorandum #23, dated 14 April 1954.

D. Relative weights to be assigned to military and academic marks in determining final precedence at Indoctrination School.

The practice of weighting academic grades 3 and military marks 1 was felt by many of the responsible school and training authorities to give inadequate weight to the latter. To arrive at a tentative criterion for evaluating military and academic grades, members of the school staff were asked to rate 71 members of one class on an 11-point distribution in terms of an "ideal" precedence list, one that would reflect "potential officer ability, all things considered." Multiple regression weights predicting this "ideal" list from military and academic grades produced a ratio of beta weights of 1.24 to 1, with high inter-rater agreement. The full description of this investigation was informally presented as: Munnally, J. C., Jr. "A Weight for Military Aptitude as a Component in the Final Precedence Score," Research Memorandum #1, dated 15 May 1953. A comparison of several different techniques of rating was presented in: Munnally, J. C., Jr. "A Study of the Military Aptitude Procedure at the Officer Indoctrination Unit (W), Newport," Research Memorandum #4, dated 15 June 1954.

E. A study of test patterns peculiar to women occupants of different officer billets.

The aim of this study was to determine if the five sub-test scores made by women naval officers on the Officer Classification Battery (OCB) might be used to differentially predict success in various officer billets, thus making possible more efficient duty assignments.

While some significant differences in means between WAVE officers in certain billet groups were found on the Verbal sub-test, the data did not permit clear differentiation into duty categories on the basis of the OCB. Hypotheses regarding the utility of OCB score in differentially predicting success in various billets were not given a chance to be tested because of the conglomerate of factors other than test performance which were determining duty assignment. The problem was described in: Vallance, T. R.

"Exploratory Study of the Officer Classification Battery as a Predictor of Success of Women Naval Officers in Different Billets," Research Memorandum #27, dated 12 July 1954.

F. Methodological research products.

In the course of work with WAVE officers Dr. J. C. Nunnally, Jr. prepared the following research memoranda dealing with statistical and methodological techniques:

"Some Uses for 'Inverse' Factor Design in Assessment Research," Research Memorandum #10, dated 6 October 1953.

"The Method of the 'Ideal Profile': A Simplified Procedure for Differentiating the Test Scores of Two or More Groups," Research Memorandum #13, dated 14 October 1953.

V. Reports

In summary, the scope of OPRP activities during the past thirty-one months is reflected in the titles of the reports prepared by its staff.

A. The following were published as Technical Bulletins of the Personnel Analysis Division, Bureau of Naval Personnel, Washington, D. C., all during the 1954 calendar year:

- 54-4 "Critical Incidents in Junior Officer Duties Aboard Destroyer-Type Vessels" by T. R. Vallance, A. S. Glickman, and J. N. Vasilas.
- 54-5 "The Validity of several Non-Cognitive Tests as Predictors of Certain Naval Officer Candidate School Criteria" by G. J. Suci and T. R. Vallance.
- 54-7 "The Naval Knowledge Test: Construction and Validation" by A. S. Glickman.
- 54-8 "Prediction of Disenrollment from Officer Candidate School from Background Variables" by A. S. Glickman.

- 54-9 "An Analysis of Peer Ratings; I. The Assessment of Reliability of Several Question Forms and Techniques Used at the Naval Officer Candidate School" by G. J. Suci, T. R. Vallance, and A. S. Glickman.
- 54-10 "An Analysis of Peer Ratings: II. Their Validity as Predictors of Military Aptitude and other Measures in the Naval Officer Candidate School" by G. J. Suci and T. R. Vallance.
- 54-12 "Development and Validation of an Experimental Battery to Select Officer Candidates for the Navy" by A. S. Glickman and T. R. Vallance.
- 54-13 "Development and Validation of a Battery to Predict Peer Ratings of Navy Officer Candidates" by A. S. Glickman.
- 54-14 "Research on Selection Instruments for Women Naval Officers" by J. C. Nunnally, Jr.
- 54-15 "The Verbal-Numerical Test: Development and Validation" by T. R. Vallance and A. S. Glickman.
- 54-17 "A Factor Analysis of a Checklist of Shipboard Junior Officers' Activities" by A. S. Glickman.
- 54-21 "Achievement Test Research and Development for the Naval Officer Candidate School and the Naval Reserve Officer Training Corps" by A. J. Bernstein.
- 54-23 "An Exploratory Study of the Applicability of Critical Incident Techniques to the Assessment of Curricula for Officer Candidate Training," by A. S. Glickman and T. R. Vallance.

B. The following are unpublished reports, given limited distribution as part of the OPRP Research Memorandum series:

- #1 "A Weight for Military Aptitude as a Component in the Final Precedence Score," dated 15 May 1953, by J. C. Nunnally, Jr.
- #2 "Commentary Deriving from Interviews with Some Voluntary Disenrollees from OCS," dated 5 June 1953, by A. S. Glickman.

- #3 "An Inverse Factor Analysis of Ship Performance," dated 9 June 1953, by A. S. Glickman.
- #4 "A Study of the Military Aptitude Rating Procedure at the Officer Indoctrination Unit (W), Newport," dated 15 June 1953, by J. C. Nunnally, Jr.
- #5 "A Report on the Non-Cognitive Traits which Differentiate More Successful from Less Successful Women Officer Indoctrinees," dated 8 July 1953, by J. C. Nunnally, Jr.
- #6 "Effects of Negatively Skewed Distributions of Ratings Upon Motivations of the Rated," dated 21 August 1953, by A. S. Glickman.
- #7 "Survey of the Literature Regarding Promising Non-cognitive Tests and Variables," dated 9 September 1953, by G. J. Suci.
- #8 "Situational Observation of Small Numbers of Subjects as a Means of Pre-testing the Significance of Variables," dated 9 September 1953, by G. J. Suci.
- #9 "Rationale for the Development of a Test of Empathy," dated 14 September 1953, by T. R. Vallance.
- #10 "Some Uses for 'Inverse' Factor Design in Assessment Research," dated 6 October 1953, by J. C. Nunnally, Jr.
- #11 "A Report on the Interests, Motives, and Backgrounds Susceptible to Recruitment for the Women Officer Program for the Navy," dated 8 October 1953, by J. C. Nunnally, Jr.
- #12 "Preliminary Study of Performance in 'Enlisted-to-Officer' Program," dated 27 October 1953, by T. R. Vallance.
- #13 "The Method of the 'Ideal Profile': A Simplified Procedure for Differentiating the Test Scores of Two or More Groups," dated 14 October 1953, by J. C. Nunnally, Jr.
- #14 "The Naval Knowledge Test: Construction and Preliminary Validation," dated 23 October 1953, by A. S. Glickman.

- #15 "Some Observations on the Stability of Ratings by Peers," dated 27 October 1953, by T. R. Vallance.
- #16 "The Stress Decrement Test--Its Development and Validation," dated 17 November 1953, by J. C. Nunnally, Jr.
- #17 "A Factor Analysis of the Junior Officer Activity Checklist," dated 20 November 1953, by A. S. Glickman.
- #18 WITHDRAWN
- #19 "Prediction of Disenrollment from Officer Candidate School from Background Variables," dated 8 December 1953, by A. S. Glickman.
- #20 "An Exploration of some Relationships between Junior Officer Activity Checklist (JOAC) Factor Scores and Overall Ship Performance Measures," dated 11 December 1953, by A. S. Glickman.
- #21 "An Exploration of some Relationships between Junior Officer Activity Checklist (JOAC) Factor Scores and OCS Achievement," dated 22 December 1953, by A. S. Glickman.
- #22 "Some Preliminary Validation Statistics for the WOQT," dated 15 December 1953, by J. C. Nunnally, Jr.
- #23 "Selection Test Research on Women Officer Trainees, since 1 January 1954," dated 14 April 1954, by T. R. Vallance.
- #24 "Further Item Analyses of the Naval Knowledge Test," dated 30 March 1954, by A. S. Glickman.
- #25 "A Naval Knowledge Test Key to Predict OCS Peer Ratings," dated 22 April 1954, by A. S. Glickman.
- #26 "Item Analysis of the Verbal-Numerical Test (formerly the Stress-Decrement Test)," dated 5 May 1954, by T. R. Vallance.

- #27 "Exploratory Study of the Officer Classification Battery (OCB) as a Predictor of Success of Women Naval Officers in Different Billets," dated 12 July 1954, by T. R. Vallance.
- #28 "Prediction of Academic Success of ROCTWO Students," dated 5 October 1954, by A. S. Glickman.
- #29 "Development of Situational Performance Problems for Evaluating and Training Potential Navy Junior Officers," dated 30 December 1954, by Barbara J. Suttell and M. Richlin.

C. Other informal reports were:

Interim Progress Report of Phase I Activities: Officer Personnel Research Project, dated 2 September 1952, by T. R. Vallance and A. S. Glickman.

Phase I Report: A Plan for Research, dated 15 October 1952, by T. R. Vallance, A. S. Glickman, and G. J. Suci.

OCS Peer Ratings, Pilot Study, dated 6 November 1952, by A. S. Glickman.

The WAVE Project: A Survey of Needs for a General Plan of Research, dated 6 March 1953, by J. C. Nunnally, Jr.

Program Recommendations for Officer Personnel Research Project, Fiscal Year 1954, dated 24 April 1953, by T. R. Vallance, A. S. Glickman, and G. J. Suci.

D. Papers presented to professional societies were:

An Analysis of Some Ship Performance Measures by the Wherry-Gaylord Iterative Factor Analysis, American Psychological Association, Cleveland, Ohio, 9 September 1953, by A. S. Glickman.

Factor Analyses of Performance Reports on Navy Junior Officers, Eastern Psychological Association, New York, N. Y., 9 April 1954, by A. S. Glickman.

The Rigidity-Authoritarianism Complex and its Relation to Performance in Military Officer Training Schools, Eastern

Psychological Association, New York, N. Y., 9 April 1954,
by T. R. Vallance.

E. These articles were accepted for publication in professional
journals:

Criterion Rationale for a Personnel Research Program. Journal of Applied Psychology, 1953, 37, 429-431, by T. R. Vallance, A. S. Glickman, and G. J. Suci.

The Effects of Negatively Skewed Distributions of Ratings Upon the Motivation of the Rated, Personnel Psychology, 1955, 8, (forthcoming publication), by A. S. Glickman.